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Title: Breakthrough MEG Technology

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Breakthrough MEG Technology

Young Jin Kim

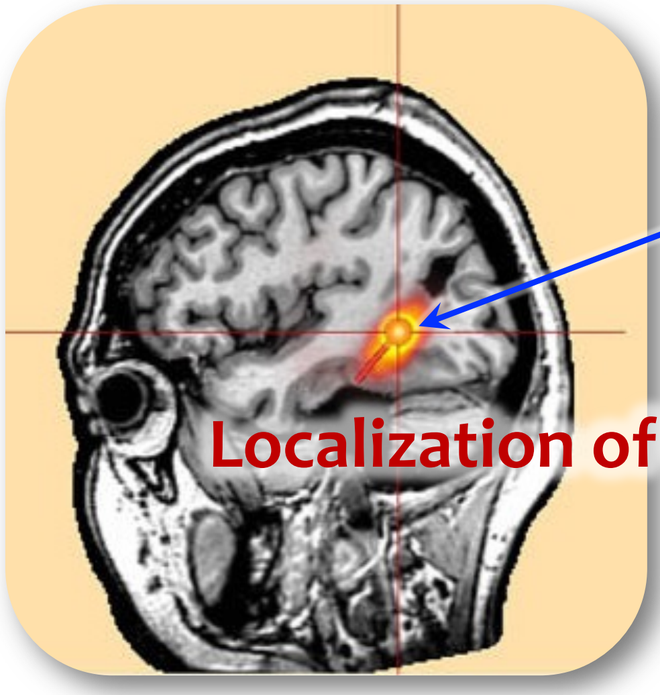
MPA-Quantum

Compact Magnetic Sensor

INTRODUCTION

MEG (magnetoencephalography) ?

- Record & investigate brain function
- Target biomagnetic fields produced by brain's activity



MEG: functional information

Localization of epilepsy focus through MEG

CURRENT MEG SYSTEMS

Commercial Providers:

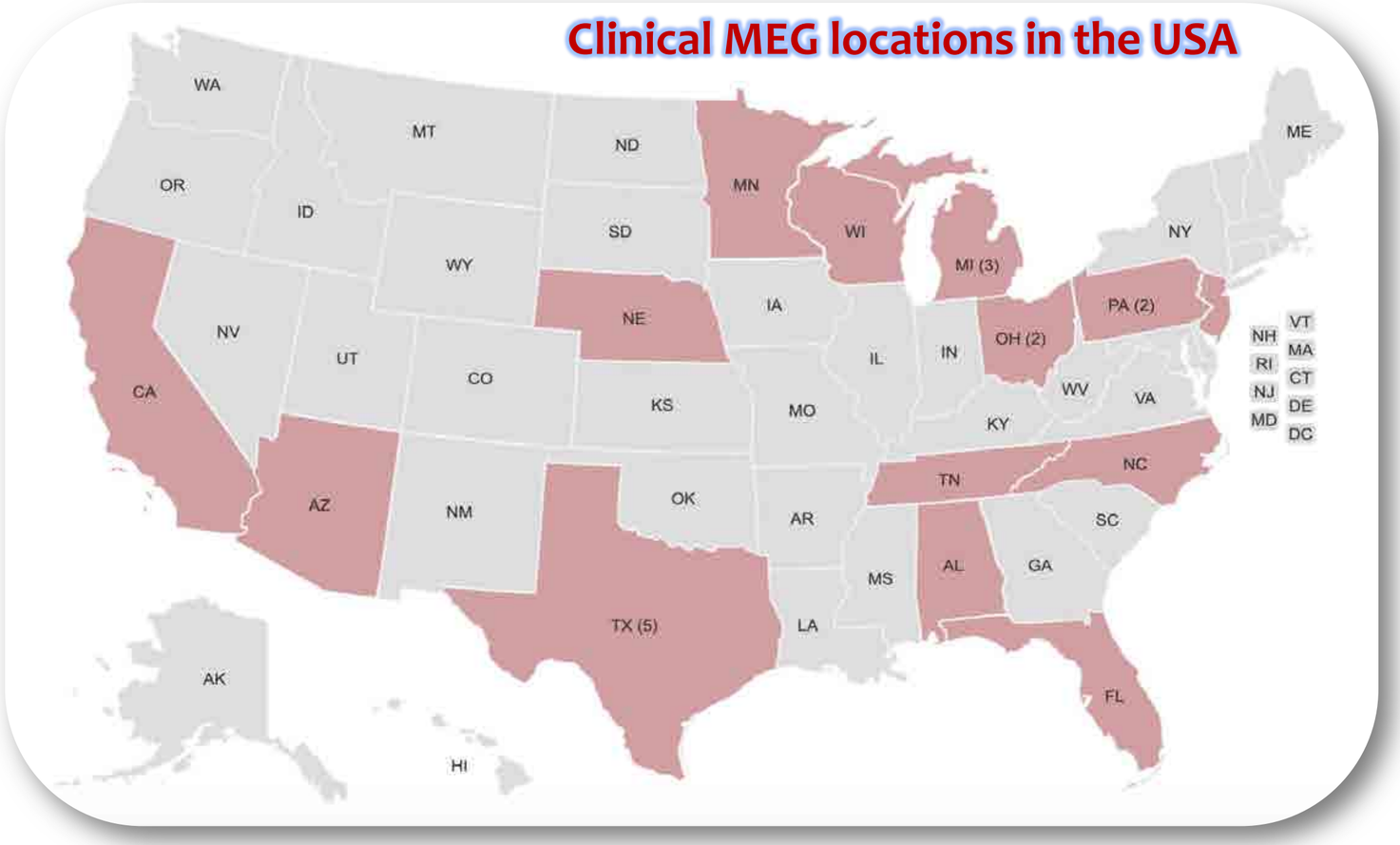
- Elekta Neuromag
- Tristan Technologies
- Compumedics Ltd
- CTF MEG International Services Ltd
- Ricoh Co., Ltd
- York Instruments Ltd

Current MEG devices are bulky & expensive

$2M + $1.5M for shielded room

$250K/year for cryogen

PROBLEM



Addressing lack of MEG imaging services:

Improve brain illness diagnostics & treatment

Los Alamos NATIONAL LABORATORY

SCALE OF PROBLEM

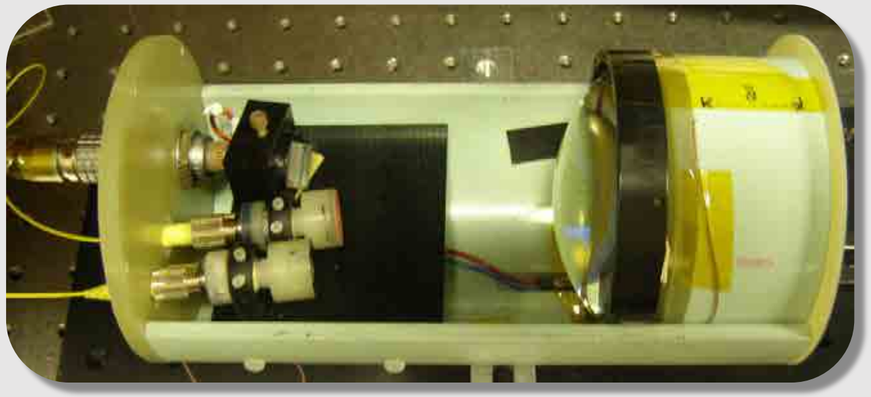
1st: Migraine
2nd: Stroke
3rd: Alzheimer's Disease

2 million in 2010
→ 3 million in 2015

MORE THAN 5 MILLION AMERICANS ARE LIVING WITH ALZHEIMER'S BY 2050, THIS NUMBER COULD RISE AS HIGH AS 16 MILLION

EVERY
66
SECONDS
someone in the United States develops the disease

HOW TO SOLVE THIS PROBLEM?



16-channel magnetic sensor

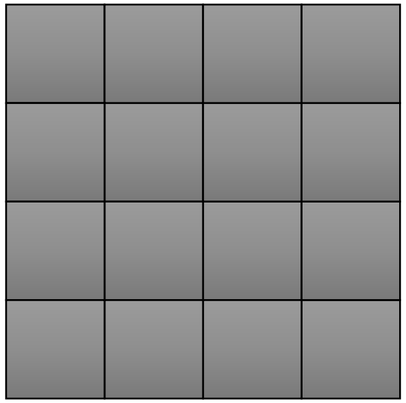
- Cryogen-free
- Compact
- Low-cost

VS

TECH COMPARISON

Multichannel capability: accelerate MEG imaging

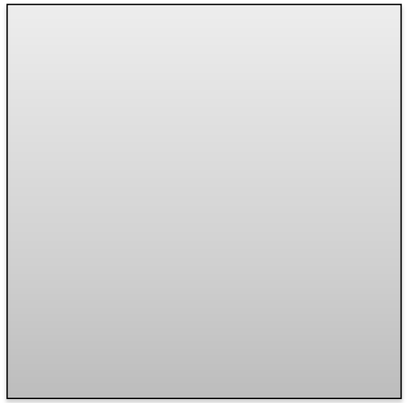
Old-fashion 16-channel magnetic sensor



Combining 16 separate sensors

VS

Novel patented LANL 16-channel magnetic sensor



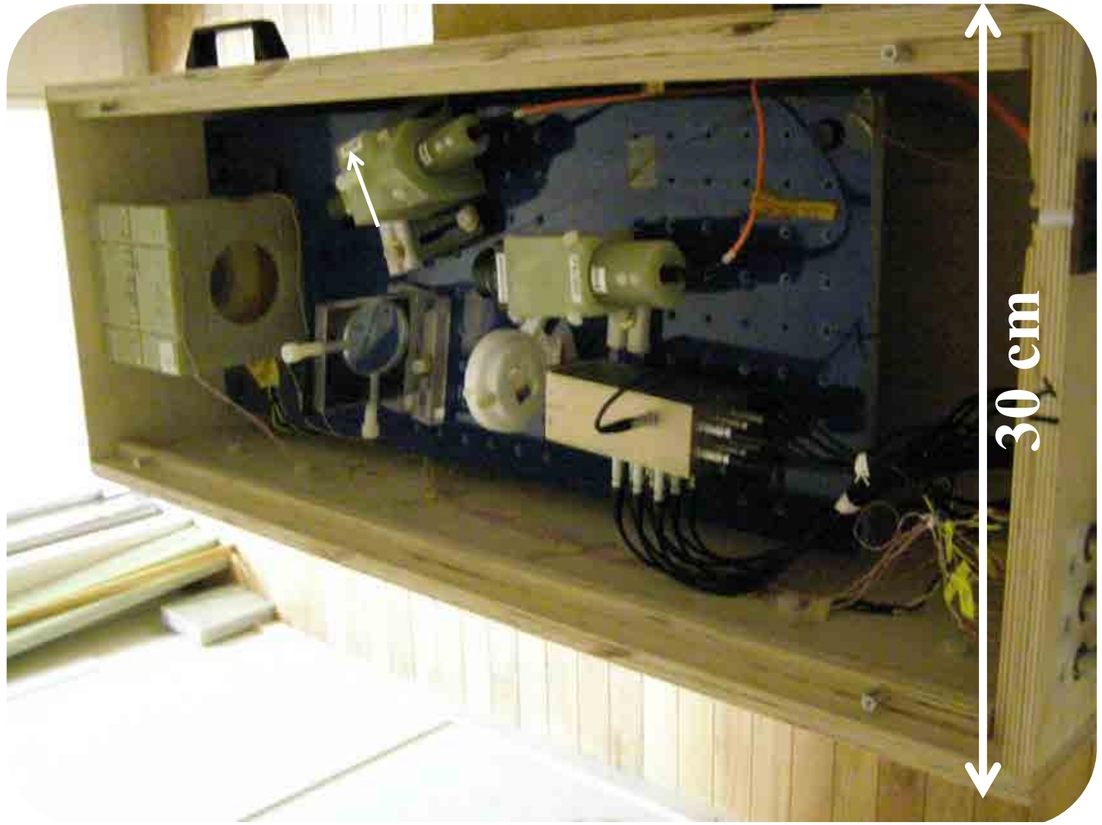
16-channel single module

10x cheaper!

"High-sensitivity multi-channel atomic magnetometer," Non-Provisional U.S. Patent Appl. No. 16/578816, filed 9/23/19

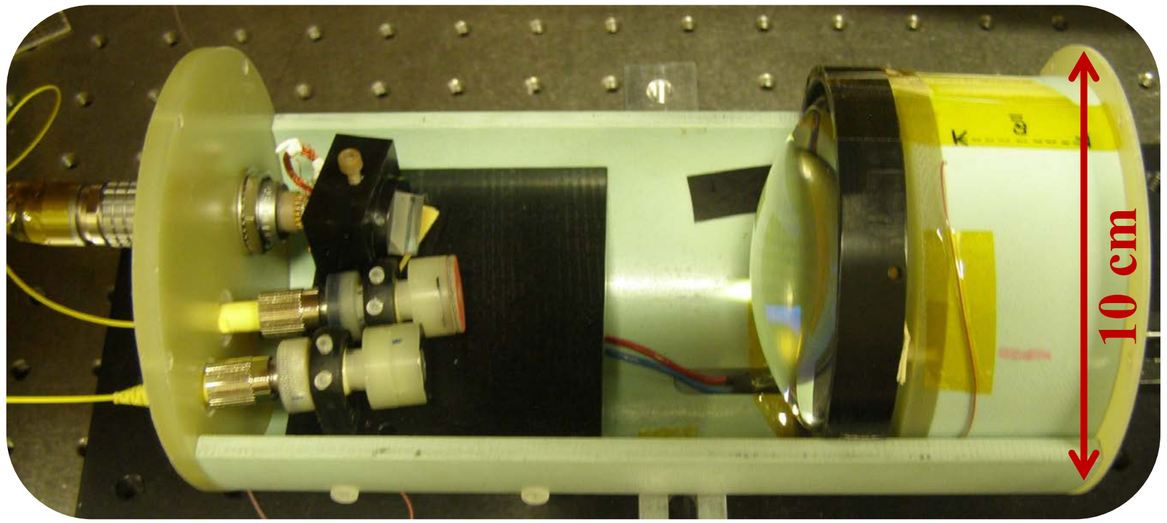
TECH STATUS – PROOF OF CONCEPT

First design for proving principle



Reflecting the feasibility for commercial MEG applications

First compact design for producing a MEG helmet

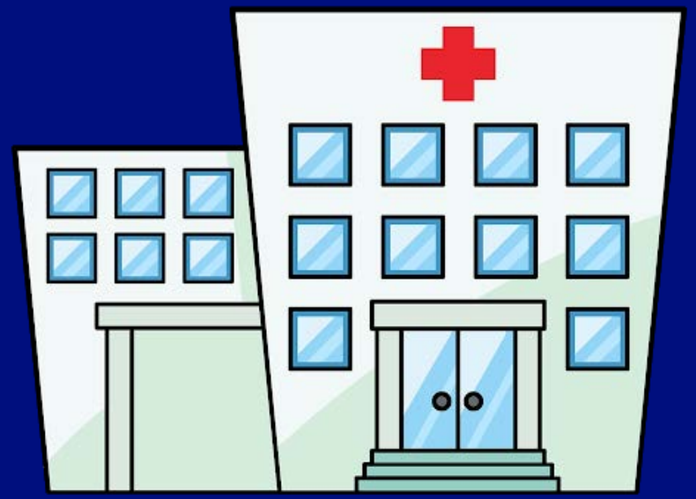


10x smaller & 10x cheaper than current MEG technologies.

Whole-head MEG helmet

TARGET CUSTOMER

- Medical imaging centers
- University R&D/Med Schools
- MEG device manufactures



VALUE PROPOSITION

LANL technology is a disruptive innovation to change market dynamics

For medical imaging experts who want to rapidly diagnose brain disorders, our LANL breakthrough MEG solution delivers faster and easier brain imaging without having to go to major urban medical centers.

Operational convenience

High Imaging quality

Cost saving

Location in regional medical centers

Adjustable Sensor Position!

Better diagnostic information

More availability & larger market

MARKET SIZE

All types of medical imaging systems

$17 billion in 2019

Annual market growth: 7.3%

Cryogen MEG systems:

$250 million in 2018

Annual market growth: 4.5%

LANL disruptive cryogen-free MEG:

$xxx million -- $1 billion ?? (>4.5% ?)

10X reduction cost and form factor

- Broader geographic access
- New market opportunities beyond current MEG market.

TECHNOLOGY ROADMAP

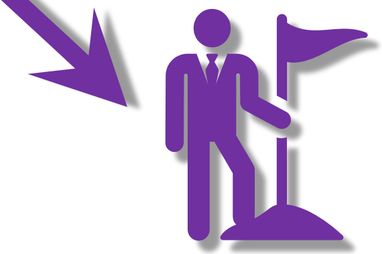
Customer discovery to validate performance requirement, imaging center users, research hospitals

T&E of LANL MEG imaging capability compared to current MEG systems

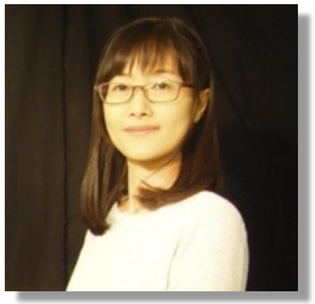
Refine MEG unit array to integrate into a full-head helmet for field testing with commercial partners (CRADA)

Year 1

Year 2-4



ABOUT ME / THE TEAM



Young Jin Kim, PhD

Igor Savukov, PhD

Scientists from MPA-Q: Quantum

Extensive capabilities for developing and testing cryogen-free ultra-sensitive magnetic measurements.

We bring the unique expertise of novel multichannel magnetic sensor for advanced MEG devices.

We are interested in addressing the challenges of existing MEG technologies to improve brain disorder diagnostics and treatments.

This work supports LANL mission in biosecurity and Global security. The applications of the sensor technology are in line with the Science of Signatures Mission Pillar.

OUR ASK

- Contact high level senior (directors) of MEG imaging centers and medical schools that use MEG imaging ?
- Identify collaborative partners (CRADA/SPP, licensing) ?
- Find funding to improve LANL MEG form factor and construct a full-head MEG helmet?

THANK YOU

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